

This listing of claims will replace the prior version in the application.

Claims

1. (canceled)
2. (currently amended) The method as claimed in claim + 17, characterized in that the column (C2) is operated under conditions such that its distillate rate relative to the flow rate of (meth)acrylic acid introduced into the absorption column (C1) is between 0.5/1 and 4/1.
3. (previously presented) The method as claimed in claim 2, characterized in that the column (C2) is operated under conditions such that its distillate rate relative to the flow rate of (meth)acrylic acid introduced into the absorption column (C1) is between 2/1 and 3/1.
4. (currently amended) The method as claimed in ~~one of claims 1 to 3~~ claim 17, characterized in that the column (C1) is operated with a solvent flow rate of said at least one heavy hydrophobic absorption solvent that is 3 to 4 times the flow rate of (meth)acrylic acid in the feed reaction gas mixture.
5. (currently amended) The method as claimed in ~~one of claims 1 to 4~~ claim 17, characterized in that an absorption column (C1) is used comprising:
 - in its lower part, at least one cooling section (S1) equipped with a system for recirculating, via an external heat exchanger (E1), part (3) of the stream (4) collected in the lower part of said at least one cooling section or sections (S1) to send it to the flow of said sections section; and
 - in its upper part, a section (S2) for the absorption and rectification of the said reaction gas mixture (1).
6. (currently amended) The method as claimed in claim 5, characterized in that a section (S2) is used, in which the number of theoretical plates is 25 to 50, ~~and preferably 30 to 45~~.
7. (currently amended) The method as claimed in ~~one of claims 1 to 6~~ claim 17, characterized in that the absorption is carried out in the column (C1) at atmospheric pressure or under a pressure close to atmospheric pressure, and at a solvent introduction temperature of 20 to 80°C, ~~preferably 30 to 60°C~~.

8. (currently amended) The method as claimed in ~~one of claims 1 to 7~~ claim 17, characterized in that the column (C1) is operated at a bottom temperature of 50 to 120°C, ~~particularly of 70 to 100°C~~.
9. (currently amended) The method as claimed in ~~one of claims 1 to 8~~ claim 17, characterized in that the column (C1) is operated at a overhead gas temperature of 40 to 70°C, ~~particularly of 50 to 60°C~~.
10. (currently amended) The method as claimed in ~~one of claims 1 to 9~~ claim 17, characterized in that the reaction gases are gas mixture is introduced at a temperature of 100°C to 200°C, ~~particularly 130°C to 180°C~~.
11. (currently amended) The method as claimed in ~~one of claims 1 to 10~~ claim 17, characterized in that one or more heavy hydrophobic absorption solvents are used, having a boiling point above 200°C at atmospheric pressure.
12. (previously presented) The method as claimed in claim 11, characterized in that ditolylether is used as a heavy hydrophobic solvent.
13. (currently amended) The method as claimed in ~~one of claims 1 to 12~~ claim 17, characterized in that the absorption column (C1) is fed solvent selected from with one or more pure solvents, ~~and/or with one or more~~ solvents issuing from the recycling of one or more streams obtained from the subsequent purification steps or mixtures thereof.
14. (currently amended) The method as claimed in ~~one of claims 1 to 13~~ claim 17, characterized in that the absorption is carried out in the column (C1) in the presence of at least one polymerization inhibitor, selected ~~in particular~~ from phenolic derivatives ~~such as hydroquinone and its derivatives such as methyl ether of hydroquinone, phenothiazine and its derivatives, such as methylene blue, quinones, such as benzoquinone, metal thiocarbamates, such as copper dibutylthiocarbamate, compounds with nitroso groups, such as N-nitroso-phenylhydroxylamine, amines such as derivatives of paraphenylenediamine, or N-oxyl compounds, such as 4-hydroxy-2,2,6,6-tetramethylpiperidine-N-oxyl~~.
15. (currently amended) The method as claimed in ~~one of claims 1 to 14~~ claim 17, characterized in that the gas stream (7) issuing from the top of the column (C1) is removed, partly to the reaction section, and partly to an incineration or purge step.

16. (currently amended) The method as claimed in ~~one of claims 1 to 14~~ claim 17, characterized in that the gas stream (7) issuing from the top of the column (C1) is sent to the bottom of a condensation section (S3) where ~~this gas mixture~~ said gas stream (7) is placed in intimate contact with a descending liquid stream (7') supplied at the flow of said section (S3) and consisting of the recycling of part of the bottom stream of said section (S3) previously cooled by an external heat exchanger (E4).

17. (new) A process for the purification of (meth)acrylic acid from reaction gas mixture obtained by catalytic or redox oxidation of a gas selected from the group consisting of propane, propylene, acrolein, isobutane, isobutene, tertbutyl alcohol, (meth)acrolein and mixture thereof, characterized in that:

said purification takes place in the presence of at least one polymerization inhibitor;

said reaction gas mixture (1) is sent to the bottom of an absorption column (C1) which is supplied at the top and in countercurrent flow with at least one heavy hydrophobic absorption solvent or solvents, to obtain:

- at the top of the column (C1) a gas stream (7) consisting of propane, propylene, isobutane, isobutene, the products of the final oxidation of the reaction gas mixture (1), major quantities of water, acetic acid, acrylic acid, acrolein and mixtures thereof;
- at the bottom of said column (C1), a stream (4) consisting of (meth) acrylic acid, said at least one heavy absorption solvent or solvents, minor quantities of acetic acid, water, acrylic acid and mixtures thereof;

the stream (4) issuing from the bottom of column (C1) is sent to a separation column (C2) in which a separation is carried out to obtain:

- at the top of column (C2), a stream (5) consisting of light impurities which are sent to the bottom of absorption column (C1); and
- at the bottom, a stream (6) consisting of components selected from the group consisting of (meth)acrylic acid in solution in the at least one heavy absorption solvent or solvents, a small proportion of acetic acid, acrylic acid, polymerization inhibitor or inhibitors and mixtures thereof

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characterized in that column (C1) is operated with flow rate of said at least one heavy hydrophobic absorption solvent or solvents that is 3 to 5.6 times the flow rate of (meth)acrylic acid in the reaction gas mixture, and in that, as a separation column (C2), a rectification column is used, which is operated with a top feed and without reflux.

18. (new) The method as claimed in claim 5, characterized in that a section (S2) is used, in which the number of theoretical plates is 30 to 45.

19. (new) The method as claimed in claim 17, characterized in that the absorption is carried out in the column (C1) at atmospheric pressure or under a pressure close to atmospheric pressure, and at a solvent introduction temperature of 30 to 60°C.

20. (new) The method as claimed in claim 17, characterized in that the column (C1) is operated at a bottom temperature of 70 to 100°C.

21. (new) The method as claimed in claim 17, characterized in that the column (C1) is operated at a overhead gas temperature of 50 to 60°C.

22. (new) The method as claimed in claim 17, characterized in that the reaction gas mixture is introduced at a temperature of 130°C to 180°C.

23. (new) The method as claimed in claim 17, characterized in that the absorption is carried out in the column (C1) in the presence of at least one polymerization inhibitor, selected from hydroquinone and its derivatives such as methyl ether of hydroquinone, methylene blue, benzoquinone, copper dibutyldithiocarbamate, N-nitroso-phenylhydroxylamine, derivatives of paraphenylenediamine, or 4-hydroxy-2,2,6,6-tetramethylpiperidine-N-oxyl.

Respectfully submitted,



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